

# White Mountain National Forest

---

## Chapter 4 Monitoring and Evaluation



Chapter Contents

---

Introduction.....	3
Monitoring and Evaluation Components.....	4
Monitoring Plan .....	5
Monitoring Guide.....	5
Biennial Monitoring and Evaluation Report .....	5
Monitoring Plan.....	6
Required Monitoring .....	6
Other Monitoring.....	11
Biennial Monitoring and Evaluation Report.....	12

Cover

*Monitoring water quality in Meserve Brook. WMNF photo by Chris Mattrick.*

## Introduction

---

The White Mountain National Forest's Forest Plan provides management direction in terms of desired conditions, goals, objectives, standards, and guidelines at the Forest and Management Area scales. Monitoring and evaluation are separate, sequential activities required by the National Forest Management Act (NFMA) to determine how well this management direction is being met, and to provide a basis for the periodic evaluation of the Forest Plan. The White Mountain National Forest's monitoring and evaluation plan (Chapter 4 of the Forest Plan) describes what we will monitor and what we expect to learn from that monitoring and subsequent evaluation.

*Monitoring* is the systematic collection of information about resource conditions, management actions, and emerging issues in a way that will reflect changes in conditions and relationships over time and space. The objective of a plan monitoring program is to:

- Enable the Responsible Official to determine if a change in plan components or other plan content may be needed.
- Inform the management of resources through means such as testing relevant assumptions, tracking relevant changes, and measuring management effectiveness and progress toward achieving or maintaining the plan's desired conditions or objectives.
- Support an adaptive land management planning process that includes social, economic, and ecological evaluations.

*Evaluation* is the interpretation or judging of the information collected during the monitoring phase. Evaluation results form the basis for adaptively managing National Forests because they:

- Evaluate the validity of assumptions used in Forest Plan development,
- Verify the effectiveness of Forest Plan standards and guidelines,
- Assess program and project effects on resource conditions in relation to management goals and desired conditions, and
- Determine when desired conditions, goals, objectives, standards, or guidelines need to change.

Forest Plan monitoring encompasses three broad categories of monitoring: implementation, effectiveness, and validation (Table 4-01). Monitoring is not performed on every activity, nor is most of it expected to meet the statistical rigor of formal research.

Table 4-01. Monitoring Categories.

<b>Monitoring Category</b>	<b>Purpose</b>
<b>Implementation</b>	Is the overall direction in the revised Forest Plan being implemented? This includes goals, objectives, desired conditions, standards, guidelines, and management area direction. Or, “Did we do what we said we were going to do?”
<b>Effectiveness</b>	Are the standards and guidelines working? It also includes an evaluation of whether there are significant changes in productivity of the land. Or “Did it work?”
<b>Validation</b>	Are the assumptions and predicted effects used to formulate the revised Forest Plan accurate? Or “Were we right in our initial understanding of the situation, did we look at the right things?”

Implementation monitoring is done primarily at the project level and is completed on a day to day basis. It occurs hundreds of times each year and includes activities such as timber sale inspections, interdisciplinary project reviews, backcountry observations by Wilderness rangers, and construction inspections. Effectiveness and validation monitoring are more programmatic, Forest-wide monitoring that is done annually or every few years to track long-term progress and effects.

## Monitoring and Evaluation Components

The Forest’s monitoring program is comprised of three components, the Monitoring Plan, Monitoring Guide, and Biennial Monitoring and Evaluation Report.

1. **Monitoring Plan.** The monitoring plan provides an outline that describes what will be accomplished as part of the Forest Plan monitoring program. Changing the monitoring plan requires an Administrative Change to the Forest Plan (36 CFR 219.13).
2. **Monitoring Guide.** Provides additional detail on the specific monitoring tasks. This information can be revised without changing the Forest Plan.
3. **Biennial Monitoring Evaluation Report.** A biennial evaluation of new information gathered through the monitoring program and relevant information from the broader-scale strategy.

## Monitoring Plan

The Monitoring Plan sets the direction, purpose, and overall context for monitoring and evaluating the Forest Plan. It establishes questions to be answered, timeframes for reporting, and indicators for required monitoring topics. Monitoring Plan direction is broad and ties directly to decisions made in this Forest Plan.

This chapter is the Monitoring Plan. Monitoring items included in this chapter are meant to define the broad areas that must be examined. Monitoring items and questions included here are intended to provide the basis for more specific, focused monitoring items to be included in the Monitoring Guide.

## Monitoring Guide

The Monitoring Guide describes the Forest's monitoring program in more detail and is external to the Forest Plan. It identifies specific monitoring items based on the direction and questions in the Monitoring Plan. The Monitoring Guide summarizes the methods, frequency, priority, partnerships, cost, and other aspects of monitoring each item. Sources for the Monitoring Guide could include handbook direction, technical manuals, scientific literature, or other sources.

Forest specialists involved in monitoring and evaluation will use the Monitoring Plan to form their conceptual approach to monitoring, but will refer to the Monitoring Guide to find the actual criteria used to measure or otherwise conduct monitoring. The list of items in the guide is beyond that normally funded; final selection of the items to be monitored in a given year is primarily based on available funding and staffing and the priorities and timing in the Monitoring Guide.

The Monitoring Guide is intended to be a flexible component that can change as new methodologies and techniques are developed, or to be more responsive to changing needs and new information. The Guide can be modified without changing the Forest Plan. This approach means that monitoring techniques can adapt to the rapid changes that occur under ecosystem management philosophies.

## Biennial Monitoring Evaluation Report

Every two years, the Forest will produce and make available a report that shares new information gathered through the plan monitoring program and relevant information from the broader-scale strategy. The biennial report is intended to:

1. Make the information obtained from monitoring available to the public in a form that is readily understandable.
2. Transform monitoring data into information that supports adaptive management so the Responsible Official can determine whether changes to the Forest Plan, management activities, or the monitoring program are warranted and whether a new assessment may be needed.

## Monitoring Plan

---

The Monitoring Plan for the White Mountain National Forest consists of a set of monitoring questions to evaluate whether plan components are effective and appropriate, and whether management is effective in maintaining or achieving progress toward desired conditions and objectives for the plan area. A monitoring question is not necessary for every desired condition, objective, or other plan component. The scope, scale, and priorities for plan monitoring must be within the financial and technical capabilities of the administrative unit.

As stated previously, the primary objectives of this monitoring plan are to enable the Responsible Official to determine if a change in plan content is needed, and test assumptions, track changes, and measure management effectiveness and progress toward achieving or maintaining the plan's desired conditions or objectives. Meeting these objectives requires that several broad questions be addressed on a regular basis:

- To what extent have Forest Plan objectives been attained?
- To what extent have Forest Plan standards and guidelines been applied?
- What are the effects of management practices prescribed by the Forest Plan?

Much of the monitoring identified in this plan is intended to help answer these questions, which will be addressed in the biennial report. Additional implementation and effectiveness monitoring is done at the project level, with Forest-wide reporting to track overall Plan implementation.

## Required Monitoring

The Planning Rule (36 CFR 219.12(a)(5)) requires that the plan monitoring program include at least one monitoring question and associated indicator(s) for each of eight topics (Table 4-02).

Table 4-02. Eight required monitoring topics.

Required Topic	Monitoring Question	Indicator
The status of select watershed conditions.	How are trends in air emissions affecting surface water quality in the WMNF?	<ul style="list-style-type: none"> <li>• Precipitation chemistry and deposition rates from sites in or near the WMNF (including nitrogen, sulfur, pH, base cations)</li> <li>• Surface water chemistry at selected sites (pH; concentration of base cations; nitrogen and sulfur species; aluminum species; dissolved organic carbon)</li> <li>• Nitrogen and sulfur loading in the form of dry deposition or cloud deposition (for high elevation sites), where information is available</li> </ul>
The status of select ecological conditions including key characteristics of terrestrial and aquatic ecosystems.	Are we managing forests at the project level in ways that move the Forest toward our Forest Plan wildlife habitat objectives?	Presence and relative abundance of seedlings of desired species in stands harvested to move conditions toward wildlife habitat composition objectives
The status of focal species to assess the ecological conditions required under § 219.9.	Are Forest Plan S&G's sufficient for protecting, restoring, or improving headwater stream ecosystems (riparian and aquatic)?	<ul style="list-style-type: none"> <li>• Biomass of wild brook trout in a stream reach (kg/hectare)</li> <li>• Density of young-of-the-year brook trout in a stream reach (#/100m<sup>2</sup>)</li> </ul>



White Mountain National Forest — Land and Resource Management Plan

Required Topic	Monitoring Question	Indicator
<p>The status of a select set of the ecological conditions required under § 219.9 to contribute to the recovery of federally listed threatened and endangered species, conserve proposed and candidate species, and maintain a viable population of each species of conservation concern.</p>	<p>What is the status of key ecological conditions required by each Federally-listed Threatened and Endangered species known to occur on the WMNF?</p>	<p>Small-whorled pogonia</p> <ul style="list-style-type: none"> <li>○ EO Rank</li> </ul> <p>Canada lynx:</p> <ul style="list-style-type: none"> <li>○ Acres of suitable foraging and denning habitat</li> </ul> <p>Northern long-eared bat:</p> <ul style="list-style-type: none"> <li>○ Number of potentially suitable roost trees</li> </ul>
<p>The status of visitor use, visitor satisfaction, and progress toward meeting recreation objectives.</p>	<p>What is the level of visitor satisfaction on the Forest (as measured by quality of experience and perception of crowding) at developed sites as well as in the backcountry?</p>	<ul style="list-style-type: none"> <li>● Arrival Rates - number of individuals arriving at a trail head during a time period.</li> <li>● Trail Occupancy - number of hikers occupying a trail segment at one time.</li> <li>● Interpersonal Trail Encounters - number of hikers encountered during a hike on a specific section of trail.</li> <li>● People Per View - number of people per view on a section of trail.</li> <li>● Delay - reduction from free-flow travel speeds.</li> <li>● People At One Time - number of people at one time on mountain summits.</li> <li>● Individual Overnights - number of campers staying at each hut or campsite.</li> <li>● Campsite sharing - percent of groups in campsites that have to share a tent platform with other groups.</li> </ul>



Chapter 4 — Monitoring and Evaluation

Required Topic	Monitoring Question	Indicator
Measurable changes on the plan area related to climate change and other stressors that may be affecting the plan area.	How are the characteristics of snow changing on the White Mountain National Forest?	<ul style="list-style-type: none"> <li>• Maximum snow depth per season</li> <li>• Maximum annual snow depth</li> <li>• Cumulative snow depth per season</li> <li>• Snow water equivalent</li> <li>• Snow cover duration</li> </ul>
Progress toward meeting the desired conditions and objectives in the plan, including for providing multiple use opportunities.	How do actual outputs and management activities compare with estimates in Forest Plan Appendix B?	<ul style="list-style-type: none"> <li>• Volume of sawtimber and pulp sold</li> <li>• Acres of even-aged regeneration, even-aged intermediate, and uneven-aged harvest</li> <li>• Total acres harvested</li> <li>• Miles of stream habitat restored</li> <li>• Number of road crossings where fish passage was restored</li> <li>• Net increase in miles of non-motorized trails and snowmobile trails</li> <li>• Net increase in number of developed campground sites</li> <li>• Net increase in backcountry facility capacity (persons at one time or PAOT)</li> <li>• Miles of roads constructed, reconstructed, and decommissioned</li> <li>• Acres of improved watershed or soil conditions</li> </ul>

White Mountain National Forest — Land and Resource Management Plan

Required Topic	Monitoring Question	Indicator
The effects of each management system to determine that they do not substantially and permanently impair the productivity of the land (per NFMA).	Is soil compaction or soil displacement occurring as a result of Forest management actions (vegetation management, prescribed fire or recreation management)? If so, are there indirect effects on forest productivity and/or forest health?	<ul style="list-style-type: none"> <li>• Soil compaction: Severity of bulk density</li> <li>• Soil displacement: Severity of erosion (sheet, rill, and gully)</li> </ul>

## Other Monitoring

The monitoring goals listed in Table 4-03 are based on broad goals from the Forest Plan. The questions highlight additional detail for monitoring the effectiveness of the Forest Plan and validation of assumptions underlying the Forest Plan to assist with adaptive management.

*Table 4-03. Other Monitoring*

<b>Monitoring Goal</b>	<b>Monitoring Questions</b>
Goal 1: Manage for Ecosystem Health	To what extent is terrestrial ecosystem health being maintained or restored by management activities?
Goal 1: Manage for Ecosystem Health	To what extent is air quality impacting Forest resources?
Goal 1: Manage for Ecosystem Health	To what extent are water resources and aquatic ecosystems being maintained or restored by management activities?
Goal 2: Provide quality recreation opportunities, experiences, and benefits not readily available elsewhere.	To what extent are we maintaining an appropriate range and quality of recreation opportunities?
Goal 3: Manage wilderness consistent with Wilderness Act.	To what extent are wilderness areas managed to preserve wilderness character?
Goal 4: Recognize the socioeconomic role of the Forest in the region.	To what extent is the Forest providing a mix of products, services, and amenities?
Goal 5: Provide for a natural appearing landscape.	To what extent are scenic goals and objectives being met?

## Biennial Monitoring and Evaluation Report

---

Data collected as part of the Monitoring Plan must be evaluated and interpreted to provide useful information. Evaluation is designed to address three basic questions.

- Is the Forest Plan implemented properly? (Implementation)
- Is the Forest Plan achieving the desired outcomes? (Effectiveness)
- Does the Forest Plan need to be changed? (Validation)

Every two years, the Forest Service will summarize what monitoring has been completed and the most recent evaluation results. At a minimum, evaluation must:

1. Enable the Forest Supervisor to assess if there have been significant changes in the condition of the land or the demands of the public that indicate a need for changes to the Forest Plan, management activities, or the monitoring program.
2. Provide a basis for determining management effects.
3. Consider how well objectives have been met and how closely standards and guidelines have been applied.
4. Assess the effects of off-road use on National Forest System lands.
5. Assess consistency with the requirements of the National Forest Management Act, including maintenance of forest productivity.

Biennial reports will assess how well the outputs, goals and objectives of the Forest Plan have been met, and how closely management standards and guidelines have been applied. Changed conditions and new information will be disclosed. Results will be used to identify changes that may be needed to the Forest Plan.